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PATENT SPECIFICATION

NO DRAWINGS

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COMPLETE SPECIFICATION

Detergent Composition

We, THE PROCTER & GAMBLE COMPANY, a corporation organised under the laws of the State of Ohio, United States of America, of 301 East Sixth Street, Cincinnati, Ohio, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to detergent compositions having superior detergent properties. Specifically, this invention relates to built detergent compositions containing mixtures of particular alkyl benzene sulphonate detergent surfactants and particular alkyl sulphate detergent surfactants, said mixtures having synergistic detergent properties.

The well known branched-chain tetrapropylene alkyl benzene sulphonate detergent surfactants are widely used and effective detergent materials. When these branched - chain alkyl benzene sulphonates are mixed with, for example, tallow alkyl sulphate detergent surfactants, the detergent properties of the mixture are what would be expected from the detergency characteristics of the individual components. Furthermore, these branched-chain alkyl benzene sulphonate detergent surfactants are more resistant to biological degradation, e.g., in fresh water supplies, than are surfactants based on straight-chain aliphatic substituents and are, therefore, a subject of criticism in this regard. It is known that alkyl benzene sulphonate detergent surfactants containing straight chain alkyl groups provide better detergency characteristics than the corresponding detergent surfactants containing branched chains. It is also known that the position of the phenyl group on the alkyl chain is important in determining detergent performance. For example, those straight chain alkyl benzene sulphonates wherein the phenyl group is positioned close to the end of the chain are known to be more effective detergent surfactants than those alkyl benzene sulphanates wherein the phenyl-group is near the middle of the alkyl chain. It is also known that, in practice, any straight-chain alkyl benzene that is prepared by current commercial processes will contain a mixture of many isomers wherein the phenyl groups are attached to different carbons in the alkyl groups. Choice of alkylation catalyst will primarily determine the distribution of isomers present in any commercial product.

The branched chain alkyl benzene sulphonates have satisfactory detergency effectiveness. When they are mixed with higher alkyl sulphate detergent surfactants such as those derived from tallow fatty alcohols, no synergistic detergency properties are evident; but rather when these branched chain alkyl benzene sulphonates are used in admixture with tallow alkyl sulphate in a detergent composition there is a straight line relationship in which the detergency is directly proportional to the relative amounts of alkyl sulphate and alkyl benzene sulphonate used and their individual characteristics.

According to the invention there is provided a built detergent composition which has acceptable foaming properties, is biodegradable and has superior detergency properties.

This built detergent composition comprises (A) from 80% to 10% of a synergistic mixture of synthetic detergent surfactants comprising 20% to 60% of alkali metal straight chain alkyl benzene sulphonate wherein the alkyl group contains 10 to 15 carbon atoms, and 80% to 40% of alkali metal straight chain primary alkyl sulphate having from 14 to 18 carbon atoms and (B) from 20% to 90% of water soluble alkaline detergency building salt, all percentages being by weight. It is to be understood that the percentages of the detergent surfactants and the building salt respectively refer solely to their relative proportions by weight and are not effected by the inclusion in any particular detergent composition of any additional different materials.

The above composition has exceptional detergent characteristics because of the synergistic interaction between the straight-chain alkyl benzene sulphonate detergent surfactant and the straight-chain primary alkyl sulphate detergent surfactant. It is very surprising that a detergency synergism is evidenced between these two detergent surfactants when there is no detergency synergism evidenced between branched chain alkyl benzene sulphonate detergent surfactants and straight chain primary alkyl sulphate detergent surfactants. In addition to the exceptional detergent characteristics, the mixtures of detergent surfactants of this invention are highly biodegradable, thereby meeting a recognized need. It is understood that "straight-chain alkyl" as used herein refers to a substituent in a single compound as well as in mixtures of compounds. The alkyl substituents in such mixtures can comprise a very small amount (e.g., about 10% or less) of chains containing some branching. Such a branched chain component is generally in the nature of an impurity. However, a small controlled amount of branching, although not preferred, can be tolerated.

As used herein, cleaning ability is the ability of a solution of a detergent composition to remove soil from cloth. Whiteness maintenance relates to the ability of a detergent solution to prevent suspended soil from depositing on the cloth during the washing operation. The term "detergency" as used herein is intended to embrace both cleaning ability and whiteness maintenance.

This synergistic detergency action of the compositions of this invention appears to be especially manifested in the area of whiteness maintenance which reflects the ability of the detergent solution to keep soil suspended in the solution once it is removed from e.g. clothes. The compositions of this invention are superior to their ability to keep soil suspended to compositions containing either detergent surfactant by itself in a built detergent composition of the known branched-chain alkyl benzene sulphonate/alkyl sulphate mixtures.

The straight chain alkyl benzene sulphonate detergent surfactant of the compositions of this invention can be prepared in a variety of ways as is well known in the art. The alkyl group can be derived, for example, from natural sources such as glycerides, by preparing the corresponding fatty alcohols and dehydrating them to form olefins. The straight chain can also be derived from petroleum sources by cracking paraffin hydrocarbons to form straight chain olefins. These olefins can then be used to alkylate benzene. The corresponding alkyl halides (e.g. alkyl chlorides) can also be used to alkylate the benzene. It will be understood that the method of preparation is immaterial as long as the alkyl group is straight-chain and contains the proper number of carbon atoms as hereinafter more fully described. Appropriate catalysts can be used to give a desired distribution of isomers, wherein the phenyl groups are attached to different carbon atoms on the alkyl chains.

Suitable catalysts for condensation of alkyl chlorides and olefins with benzene include the typical Friedel-Crafts, catalysts such as the halides of iron, zinc, antimony, boron, tin, titanium, and indium (e.g., aluminium chloride, iron chloride, zinc chloride and boron fluoride); activated earths; and sulphuric acid and acid derivatives thereof such as chlor-sulphonic acid. Sulphonation of the straight-chain alkyl benzene is effected by the usual well known methods.

The distribution of straight-chain alkyl benzene sulphonate isomers employed will depend to a great degree upon the desired characteristics of the finished detergent composition. For example, maximum detergency is achieved when the isomer distribution is high in 1- and 2-phenyl isomers. When maximum foaming is desired, however, the isomer distribution should be high in, for example, 4-, 5- and 6-phenyl isomers. The alkyl chain length is also important. For example, maximum detergency occurs when the chain length average is from about 13 to about 15 carbon atoms, whereas maximum foaming can be achieved when the average chain length is from about 11 carbon atoms to about 13 carbon atoms. It appears that in most commercial alkyl benzenes there is little, if any, of the 1-phenyl isomer; this is preferred because the sulphonate of the 1-phenyl isomer is of low aqueous solubility. It also appears that, in general the 2-phenyl isomer can be treated as one entity and the 3-, 4-, 5-, etc., phenyl isomers as being approximate equivalents in determining detergency characteristics from chemical identities of mixtures. Accordingly, it can be stated that straight-chain alkyl benzene sulphonates rich in 2-phenyl isomer should have a lower average chain length than corresponding straight-chain alkyl benzene sulphonates which are low in 2-phenyl isomer to provide equivalent foaming performance. This follows from the increase in foaming ability as the phenyl group in such sulphonates is moved to the centre of the alkyl chain. These factors should be considered in the eventual choice of a commercial alkyl benzene used to prepare the straight-chain alkyl benzene sulphonate employed. If 1 - phenyl isomer is present, it can be considered to be the rough equivalent of 2-phenyl isomer, except for its lower solubility.

It will be understood that alkyl benzene sulphonate compounds and primary alkyl sulphate compounds having ranges of chain lengths as provided herein are suitable and that pure compounds of only one chain length at the upper or lower limits of the ranges can be, but are not ordinarily, considered for use. Pure materials can be used, but it is preferable

and more economical to use mixtures of compounds having differing chain lengths.

In the selection of chain lengths for use in this invention, whether pure compounds or mixtures are used, certain trends should be taken into account. For instance, the C_{15} straight-chain alkyl benzene sulphonate will have low-foaming characteristics, for the same isomer distribution, relative to alkyl benzene sulphonates that contain shorter straight-chain alkyl groups. Similarly, the C_{16-18} primary alkyl sulphates have low-foaming characteristics compared with shorter alkyl chain lengths. However, for conventional wash temperatures of about 130°F., both the C_{15} straight-chain alkyl benzene sulphonate and the C_{16-18} primary alkyl sulphates are excellent detergent materials. Although the pure straight-chain alkyl benzene sulphonates appear to have good detergent efficiency up to an alkyl length of about C_{15}, admixture with the primary alkyl sulphates increases their detergent efficiency. A logical extension of this observation is the detergency benefit derivable from mixtures of straight-chain alkyl benzene sulphonates wherein the average chain length is as high as about C_{15} and pure straight-chain alkyl benzene sulphonates which are of a slightly longer chain length than C_{15} with the primary alkyl sulphate compounds of this invention.

The C_{10} straight-chain alkyl benzene sulphonate serves as a unique example of this invention. The C_{10} straight-chain alkyl benzene sulphonate has rather marginal detergency as compared with the higher homologues. However, in combination with the straight-chain alkyl sulphate detergent surfactants of this invention, the C_{10} straight-chain alkyl benzene sulphonate exhibits essentially the same exceptional detergency associated with the C_{12} straight-chain alkyl benzene sulphonate. A logical extension of this observation is the detergency benefit derivable from mixtures of straight-chain alkyl benzene sulphonates wherein the average chain length is about C_{10}. A diminished benefit can be expected with lower adjacent homologues of the C_{10} alkyl benzene sulphonate.

A particular straight-chain alkyl benzene sulphonate detergent surfactant which can be substituted in prior formulations for the well known branched chain alkyl benzene sulphonate detergent surfactant with acceptable foaming performance, and with improved detergency characteristics, is such that up to 5% of the alkyl groups contain less than 10 carbon atoms; up to 30% of the alkyl groups contain 10 carbon atoms; from 15% to 60% of the alkyl groups contain 10 or 11 carbon atoms; from 10% to 45% of the alkyl groups contain 13 or 14 carbon atoms; up to 25% of the alkyl groups contain 14 carbon atoms; up to 15% of the alkyl groups contain more than 14 carbon atoms and the balance of the alkyl groups contain 12 carbon atoms, the balance being preferably at least 10%, all percentages being by weight. This mixture suitably has from 10% to 50% 2 - phenyl isomers, the balance being 3-, 4-, 5-, 6-, 7-, and 8-phenyl isomers, and a molecular weight of from about 230 to about 260.

The sulphonate group in these straight-chain alkyl benzene sulphonates is normally in the para position. The cation as described hereinbefore is an alkali metal, preferably sodium or potassium. It will be understood, however, that sodium will normally be preferred, both for economic reasons and for physical properties of the granule such as strength and pourability, if the composition is in spray-dried granular form.

The straight - chain primary alkyl sulphate detergent surfactants of this invention may be derived from e.g. tallow alcohols, but the alkyl portion of the surfactant can be derived in other manners as, for example, by preparation from petroleum products, e.g., C_{14}–C_{18} primary fatty alcohol prepared by hydrolyzing olefin-derived alkyl bromide. The cation of these alkyl sulphate detergent surfactants is an alkali metal, preferably sodium or potassium. The sodium cation is again preferred for physical properties of granules such as strength and pourability, when the detergent composition is in the spray - dried form. A preferred primary alkyl sulphate detergent surfactant is that derived from tallow alcohols, which are predominantly a mixture of cetyl and stearyl alcohols. Pure cetyl sulphate or stearyl sulphate can also be used. The C_{16} and C_{18} alcohols derived from the higher boiling fraction of coconut fatty alcohol can also be used.

The compositions of this invention can contain from 0.5% to 5% by weight of an organic foam builder selected from the group consisting of C_{10}—C_{16} fatty alcohols and normal amides, monoethanolamides, diethanolamides, isopropanolamides and butanolamides and normal amide of such acids are preferred.

The compositions of this invention contain from 20% to 90% by weight of water-soluble alkaline detergency builder salts either of the organic or inorganic types. The weight ratio of builder salts to detergent actives is preferably from 0.7 : 1 to 9 : 1. Examples of water-soluble inorganic alkaline builder salts which can be used, alone or in admixture with themselves and organic alkaline sequestrant builder salts are alkali metal carbonates, phosphates, pyrophosphates, polyphosphates, and silicates. Specific examples of such salts are sodium tripolyphosphate, sodium carbonate, potassium carbonate, sodium pyrophosphate, potassium pyrophosphate, potassium tripolyphosphate, and sodium hexametaphosphate. Examples of organic alkaline sequestrant builder salts which can be used alone or in admixture with each other or with the preceding inorganic alkaline builder salts, are alkali metal, especially sodium and potassium,

amino polycarboxylates (e.g. ethylene diamine tetraacetates, N - (2 - hydroxyethyl) - ethylene diamine triacetates, nitrilo triacetates (NTA) and N - (2 - hydroxyethyl) - nitrilo diacetates). Other organic builder salts include the alkali metal salts of phytic acid, e.g. sodium phytate (see British Patent Specification 714,212), and water-soluble salts of ethane - 1 - hydroxy - 1,1 - diphosphonate (EHDP), e.g. the trisodium and tripotassium salts, are also suitable. Mixtures of any of the preceding organic or inorganic builder can be used, especially the EHDP - containing mixtures described in British Patent application 43,732/63. (Serial No. not known).

Preferably, the builder salts are tripolyphosphates, pyrophosphates, NTA or EHDP and mixtures thereof, especially the sodium salts, and a particularly preferred builder composition is a mixture of sodium tripolyphosphate, sodium nitrilo triacetate and sodium ethane-1-hydroxy - 1,1 - diphosphonate.

Granular detergent compositions containing straight chain alkyl benzene sulphonate detergents sometimes exhibit a slight tendency to stickiness. This is eliminated if up to 5%, by weight, of alkali metal nitriloacetate and/or ethylene diamine tetraacetate is included in admixture with sodium tripolyphosphate as builder.

The detergent compositions of this invention can contain, if desired, any of the usual adjuvants, diluents and additives, for example, moisture, perfumes, other organic detergent surfactants, anti-tarnishing agents, anti-redeposition agents, bacteriostatic agents, dyes, fluorescers and foam depressors, without detracting from the advantageous properties of the compositions.

The compositions of this invention often tend to be corrosive toward aluminium, thus, if the detergent solution is to contact this metal repeatedly or for prolonged periods of time, especially at elevated temperatures, a corrosion inhibitor should desirably be included. Soluble silicates are highly effective inhibitors when added to the compositions of this invention, preferably at levels of from about 3.5% to about 10% by weight. Potassium, or preferably sodium silicates having a weight ratio of SiO_2/M_2O of from about 1.0 to about 2.6 and preferably from 1.6 to about 2.6 can be used. "M" in this ratio refers to sodium or potassium.

The compositions of this invention are preferably in granular form, e.g., spray-dried, but can also be in compressed granular (tabletted) form or in the form of liquid dispersions. Preferably the compositions should provide a pH in washing solution in the range of 9 to 12; all of the following Examples provide a pH in this range.

The following Examples are illustrative of the practice of this invention.

EXAMPLE I

Composition	Material	% in Formula (Active Basis)
I	Sodium tallow alkyl sulphate	20.0
	Sodium tripolyphosphate	50.0
	Sodium silicate (1:1.6 $Na_2O:SiO_2$)	6.0
	Sodium sulphate	23.75
	Sodium carboxymethyl cellulose	0.25
II	Sodium tallow alkyl sulphate	12.0
	*Sodium straight-chain (C_{13}) alkyl benzene sulphonate	8.0
	Sodium tripolyphosphate	50.0
	Sodium silicate (1:1.6)	6.0
	Sodium sulphate	23.75
	Sodium carboxymethyl cellulose	0.25

EXAMPLE I

Composition	Material	% in Formula (Active Basis)
III	Sodium tallow alkyl sulphate	12.0
	*Sodium straight-chain (C_{13}) alkyl benzene sulphonate	8.0
	Sodium tripolyphosphate	25.0
	Sodium ethane-1-hydroxy-1,1 diphosphonate	5.6
	Sodium nitrilotriacetate	12.2
	Sodium silicate (1:1.6)	6.0
	Sodium sulphate	30.95
	Sodium carboxymethyl cellulose	0.25
IV	Sodium tetrapropylene benzene sulphonate	20.0
	Sodium tripolyphosphate	50.0
	Sodium silicate (1:1.6)	6.0
	Sodium sulphate	24.0
V	Sodium tetrapropylene benzene sulphonate	10.0
	Sodium tallow alkyl sulphate	10.0
	Sodium tripolyphosphate	50.0
	Sodium silicate (1:1.6)	6.0
	Sodium sulphate	24.0
VI	Sodium tallow alkyl sulphate	20.0
	Sodium tripolyphosphate	50.0
	Sodium silicate (1:1.6)	6.0
	Sodium sulphate	24.0

* The straight-chain alkylbenzene sulphonates used in Example I contained approximately 97% alkyl groups containing 13 carbon atoms and approximately 3% containing 12 carbon atoms. The phenyl position distribution was approximately 12% 2-phenyl, 12% 3-phenyl, 13% 4-phenyl, 20% 5-phenyl, 24% 6-phenyl, and 19% 7-phenyl.

The above compositions were tested in a standard Wash-Wear test which was conducted as follows:

White shirts, cotton T-shirts and other fabrics were distributed among various male individuals and each shirt and T - shirt was worn for one normal working day under uniform conditions. The soiled shirts and fabrics were then washed in an automatic agitating-type washer for 10 minutes with detergent solutions at 130° F. After washing the clothes were rinsed (six spray rinses and one deep rinse) and then dried. The water had a hardness of 8.4 grains per gallon and the detergent composition concentration in solution was 0.1%. (No fluorescers or bleaches were used.) Direct comparisons were made by a panel of 5 skilled graders between pairs of shirts and fabrics worn and soiled by the same individual. The shirts and fabrics were graded on the degree of cleanness and whiteness maintenance obtained, paying particular attention to the

collars and cuffs. The relative cleaning effectiveness of each detergent composition was graded on a raw score under U.V.-free light and simulated north daylight, averaged, and then translated on to a 1—10 scale wherein on the scale 1 is filthy, 5 is acceptable, and 10 is clean, with the remaining numbers representing intermediate values of these conditions.

The above compositions, when tested by the above Wash-Wear test, gave the following results.

Composition	Cleaning	Whiteness Maintenance
I	8.3	7.9
II	9.2	9.5
III	9.6	10.0
IV	4.8	3.0
V	6.9	4.3
VI	8.1	6.5

Composition II containing the mixture of straight-chain alkyl benzene sulphonate and primary alkyl sulphate detergent is clearly superior in detergency to composition I containing only the primary alkyl sulphate detergent; it had acceptable foaming. Compositions IV and V clearly disclose the increasingly poor performance when the corresponding branched chain alkyl benzene sulphonate is substituted for part (Example V) or all (Example IV) of the primary alkyl sulphate detergent of composition VI. Composition III is a particularly preferred example of the improved mixture of detergent actives of this invention with the improved detergent builder mixtures of the aforementioned British Patent application 43,732/63 (Serial No. Not Known). Compositions II and III exemplify the preferred 60:40 ratio of tallow alkyl sulphate and straight chain alkyl benzene sulphonate. Sodium cetyl or stearyl sulphate can be substituted for the tallow alkyl sulphate in Composition III with similar results.

The wash water of Compositions II and III was more readily biodegraded than that of Compositions IV and V.

EXAMPLE II

A built detergent granular composition was prepared by combining in a crutcher 1 12.9 pounds sodium alkyl benzene sulphonate paste (2.6 pounds sodium alkyl benzene sulphonate, 7.7 pounds water, 2.5 pounds Na_2SO_4, and the balance miscellaneous) prepared by sulphonating and neutralizing a commercial straight-chain alkyl benzene having an average molecular weight of about 264; (2) 13.2 pounds of sodium tallow alkyl sulphate paste (3.2 pounds sodium tallow alkyl sulphate, 7.8 pounds water, 2 pounds Na_2SO_4, and the balance miscellaneous); (3) 4.6 pounds of sodium silicate (2 pounds silicate solids) (1.6 $SiO_2:Na_2O$); (4) 0.75 pounds unsubstituted amide of a C_{20}—C_{14} fatty acid mixture; 0.7 pounds sodium toluene sulphonate; 16.5 pounds sodium tripolyphosphate (anhydrous); 2.1 pounds water; 54.5 grams sodium carboxymethyl cellulose; and 3.0 grams benzotriazole. The above crutcher mix was spray dried to form highly desirable built synthetic detergent granules having exceptional detergent characteristics in laundering soiled clothing in aqueous solution. The organic components of the washing solution were readily biodegraded.

The alkyl benzene sulphonate in this example contained approximately 28% 2-phenyl isomer (the balance 3 - phenyl and higher) and has a chain length distribution in which 16% was C_{11}, 27% was C_{12}, 35% was C_{13}, and 22% was C_{14}.

Similar granular compositions having similar characteristics were prepared in a similar manner, with the exception that the sodium toluene sulphonate and benzotriazole were replaced with sodium sulphate; and the alkyl benzene sulphonates had the following chain length distributions and contents of the 2-phenyl isomer, in each case the balance of the isomers was a mixture of the 3 - phenyl and higher isomers. The following chain length distributions in some cases do not add up to 100% since the given figures are the results of actual analyses and experimental error is involved:

I C_{10} — 21%
C_{11} — 20%
C_{12} — 16%
C_{13} — 18%
C_{14} — 16%
C_{15} — 9%
2-phenyl isomer — 42%

II C_{10} — 4%
C_{11} — 43%
C_{12} — 30%
C_{13} — 15%
C_{14} — 5%
C_{15} — 1%
2-phenyl isomer — 31%

III C_{10} — 5%
C_{11} — 18%
C_{12} — 21%
C_{13} — 21%
C_{14} — 12%
C_{15} — 12%
2-phenyl isomer — approximately 40%

IV C_{10} — 4%
C_{11} — 30.5%
C_{12} — 52%
C_{13} — 11%
C_{14} — 2%
C_{15} — 0.5%
2-phenyl isomer — approximately 28%

V	C_{10}	— 12%
	C_{11}	— 35%
	C_{12}	— 27%
	C_{13}	— 18%
	C_{14}	— 4%
	unknown	— 4%
		2-phenyl isomer — 33%
VI	C_9	— 3%
	C_{10}	— 16%
	C_{11}	— 21%
	C_{12}	— 22%
	C_{13}	— 20%
	C_{14}	— 17%
	C_{15}	— 2%
		2-phenyl isomer approximately 40%
VII	C_{10}	— 4%
	C_{11}	— 19%
	C_{12}	— 28%
	C_{13}	— 27%
	C_{14}	— 15%
	C_{15}	— 2%
	unknown	— 6%
		2-phenyl isomer — 19%
VIII	C_{11}	— 16%
	C_{12}	— 29%
	C_{13}	— 33%
	C_{14}	— 21%
	C_{15}	— 1%
		2-phenyl isomer — 28%

IX C_9 — 2%
C_{10} — 13%
C_{11} — 34.5%
C_{12} — 32.5%
C_{13} — 17%
C_{14} — 1%
2-phenyl isomer — 33%

X C_{10} — 6%
C_{11} — 39%
C_{12} — 45%
C_{13} — 10%
2-phenyl isomer — 23%

When granular compositions similar to those in Example II are prepared in which the sodium tripolyphosphate is replaced in whole or in part, by sodium carbonate, sodium pyrophosphate, sodium ethylene diamine tetraacetate, potassium nitrilo triacetate, sodium phytate, tripotassium ethane 1 - hydroxy - 1,1 - diphosphonate, or mixtures thereof, similar results are achieved in that granular detergent compositions are prepared having good detergency, foaming and biodegradability characteristics and exhibiting similar synergistic properties when compared in a parallel manner with tallow alkyl sulphate and/or tetrapropylene benzene sulphonate based compositions as described in Example I.

WHAT WE CLAIM IS:—

1. A built detergent composition comprising (A) from 80% to 10% of a synergistic mixture of synthetic detergent surfactants comprising 20% to 60% of alkali metal straight-chain alkyl benzene sulphonate wherein the alkyl group contains from 10 to 15 carbon atoms, and 80% to 40% of alkali metal straight-chain primary alkyl sulphate having from 14 to 18 carbon atoms and (B) from 20% to 90% of water soluble alkaline detergency building salt, all percentages being by weight

2. A detergent composition according to claim 1, wherein the weight ratio of building salt to detergent actives is from 0.7 : 1 to 9 : 1.

3. A detergent composition according to claim 1 or 2, wherein the alkyl benzene sulphonate contains from 10% to 50% of the 2 - phenyl isomer, and has alkyl groups of chain lengths such that up to 5% contain less than 10 carbon atoms, up to 30% contain 10 carbon atoms, from 15% to 60% contain 10 or 11 carbon atoms, from 10% to 45% contain 13 or 14 carbon atoms, up to 25% contain 14 carbon atoms, up to 15% contain more than 14 carbon atoms, and the balance contains 12 carbon atoms, all percentages being by weight.

4. A detergent composition according to any one of of the preceding claims wherein the alkali metal alkyl benzene sulphonate is the sodium or potassium salt.

5. A detergent composition according to any one the preceding claims, wherein the alkali metal straight chain alkyl sulphate is derived from tallow alcohols.

6. A detergent composition according to any one of the preceding claims, wherein the alkali metal primary alkyl sulphate is the sodium or potassium salt.

7. A detergent composition according to any of the preceding claims, wherein the alkaline detergency building salt comprises one or more of alkali metal pyrophosphates, polyphosphates, ethylene diamine tetraacetates, nitrilotriacetates, ethane - 1 - hydroxy - 1,1 - diphosphonates, N - (2 - hydroxyethyl) - nitrilo - diacetates, and N - (2 - hydroxyethyl - ethylene diamine triacetates.

8. A detergent composition according to any one of the preceding claims wherein the alkaline detergency building salt is sodium tripolyphosphate.

9. A detergent composition according to any one of claims 1 to 7 wherein the alkaline detergency building salt is sodium tripolyphosphate with up to 5%, by weight of the composition, of alkali metal nitrilotriacetate and/or ethylene diamine tetraacetate.

10. A detergent composition according to any one of claims 1 to 7 wherein the alkaline

detergency building salt is a mixture of sodium tripolyphosphate, sodium nitrilotriacetate and sodium ethane - 1 - hydroxy - 1,1 - diphos - phonate.

11. A detergent composition according to any one of the preceding claims, which contains 0.5% to 5% by weight of a normal amide, monoethanolamide, diethanolamide, isopropanolamide or butanolamide of one or more fatty acids having 10 to 16 carbon atoms.

12. A detergent composition according to claim 1 and described in either of the Examples.

For the Applicants,
CARPMAELS & RANSFORD,
Chartered Patent Agents,
24 Southammpton Buildings,
Chancery Lane, London W.C.2.

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